CLAIMS

What is claimed is:

1. An antenna for use in a wireless communication system, the antenna comprising:

a housing having a dome shaped exterior portion thereof;

a focusing transreflector consisting of a conductive grating disposed along a surface of the dome and further defining an axis for the antenna, the orientation of the conductive grating such that radiation having a particular polarization passes through the conductive grating and radiation of other polarizations is reflected by the conductive grating; and

a twist reflector substantially centered along the axis and located at a distance away from the transreflector such that the twist reflector reflects received radiation back towards the focusing transreflector and imparts a polarization to the received radiation thereby reflected so that the focusing transreflector causes the reflected and polarized radiation to be focused along the axis.

2. An antenna as in claim 1 wherein the conductive grating is formed on an interior surface of the dome.

3. An antenna as in claim 1 wherein the conductive grating is formed of a plurality of parallel conductors with a spacing typically less than one-fifth of the wavelength of a carrier frequency used in the wireless communication system.

4. An antenna as in claim 1 wherein the twist reflector further comprises:

a metal plate having grooves formed in a surface facing the conductive grating.

5. An antenna as in claim 1 wherein the twist reflector further comprises:

a methal backed dielectric layer, the dielectric layer having grooves formed therein to import the polarization.

6. An antenna as in claim 4 wherein the grooves formed in the metal plate have a depth of about one-quarter of the wavelength of a carrier frequency used in the wireless communication system.

7. An antenna as in claim 4 wherein approximately one to three grooves are formed in the twist plate per wavelength of a carrier frequency used in the wireless communication system.

8. An antenna as in claim 1 wherein the twist reflector further comprises:

a metal-backed dielectric layer with conductive grating created on its forward surface.

9. An antenna as in claim 1 wherein the twist reflector is additionally formed on an external face of a housing in which are enclosed a radio transceiver for receiving microwave data signals on a carrier frequency.

10. An antenna as in claim 8 wherein the twist reflector further serves as a heat sink for electronic components of the radio transceiver.

11. An antenna as in claim 1 wherein a feed point is disposed at the twist reflector along the axis of reception.

12. A radio unit for use in a wireless communication system using microwave radio carrier frequencies, the radio unit comprising:

an antenna additionally including:

a housing having a dome shaped exterior portion thereof;

a focusing transreflector consisting of a conductive grating disposed along a surface of the dome and further defining an axis for the antenna, the orientation of the conductive grating such that radiation having a particular polarization passes through the conductive grating and radiation of other polarizations is reflected by the conductive grating;

a twist reflector substantially centered along the axis and located at a distance away from the transreflector such that the twist reflector reflects received radiation back towards the focusing transreflector and imparts a polarization to the received radiation thereby reflected so that the focusing transreflector causes the reflected and polarized radiation to be focused along the axis;

a feed point disposed at the twist reflector along the axis, and arranged to couple transmit energy to the antenna and to couple receive energy from the antenna;

a microwave transceiver, arranged to couple microwave modulated transmit signals and receive signals to the antenna through the feed point; and

a modem, arranged to provide modulated data signals to the transceiver, and to provide demodulated data signals at an output thereof.

13. A radio unit as in claim 12 wherein the conductive grating is formed of a plurality of parallel conductors with a spacing typically less than one-fifth of the wavelength of the microwave carrier frequency.

14. A radio unit as in claim 12 wherein the twist reflector further comprises:

a metal plate having grooves formed in a surface facing the conductive grating.

15. A radio unit as in claim 14 wherein the grooves formed in the twist plate have a depth of about one-quarter of the wavelength of the microwave carrier frequency.

16. A radio unit as in claim 14 wherein approximately one to three grooves are formed in the twist plate per wavelength of the microwave carrier frequency.

17. A radio unit as in claim 12 wherein the twist reflector further comprises a metal backed dielectric layer with a conductive grating created on its forward side.

18. A radio unit as in claim 12 wherein the twist reflector is additionally formed on an external face of a housing in which are enclosed a radio transceiver for receiving microwave data signals on the microwave carrier frequency.

19. A radio unit as in claim 18 wherein the twist reflector further serves as a heat sink for electronic components of the transceiver.

20. A radio unit as in claim 12 wherein the feed point is disposed at the twist reflector along the axis of reception.

21. A method for making an antenna for use in a wireless communication system, the antenna comprising:

a housing having a dome-shaped exterior portion thereof;

a focusing transreflector consisting of a conductive grating disposed along a surface of the dome and further defining an axis for the antenna, the orientation of the conductive grating such that radiation having a particular polarization passes through the conductive grating and radiation of other polarizations is reflected by the conductive grating; and

a twist reflector substantially centered along the axis and located at a

distance away from the transreflector such that the twist reflector reflects received radiation back towards the focusing transreflector and imparts a polarization to the received radiation thereby reflected so that the focusing transreflector causes the reflected and polarized radiation to be focused along the axis;

wherein the method for making such a transreflector comprising the steps of:

(a) forming on one surface of a synthetic resin carrier film a series of spaced parallel patterns of a conductive material;

(b) placing said film on the surface of a mold defining the desired concave internal curve for the transreflector; and

(c) assembling over said film in said spaced relationship a second mold half having the desired convex external curve for the transreflector, said housing providing a mold cavity.

22. A method as in claim 21 additionally comprising the step of:

allowing a carrier substrate to remain integral to the resulting molded transreflector article.

23. A method as in claim 21 additionally comprising the step of:

introducing a fluid synthetic resin into said mold cavity to form the desired transreflector element with said spaced parallel stripes disposed on an internal concave surface thereof.

24. A method of making a transreflector according to claim 21 in which the resin of the carrier film is a low loss dielectric.

25. A method of making a transreflector according to claim 21 wherein the resin of said carrier film is a polyester.

26. A method of making a transreflector according to claim 21 wherein the transreflector element is a generally circular configuration.

27. The method of making a transreflector according to claim 21 wherein the step of forming spaced parallel stripes comprises physical vapor deposition of a metal.

28. A method as in claim 21 wherein the step of forming the conductive pattern comprises the steps of etching a conductive substrate.

29. A method as in Claim 28 in which the conductive substrate is pad printed or silk screened.

30. A method of making a transreflector as in claim 21 wherein the step of forming the conductive pattern on the substrate comprises etching a pre-clad material.